Integrating Scheduling And Earned Value Metrics

presented at

presented by

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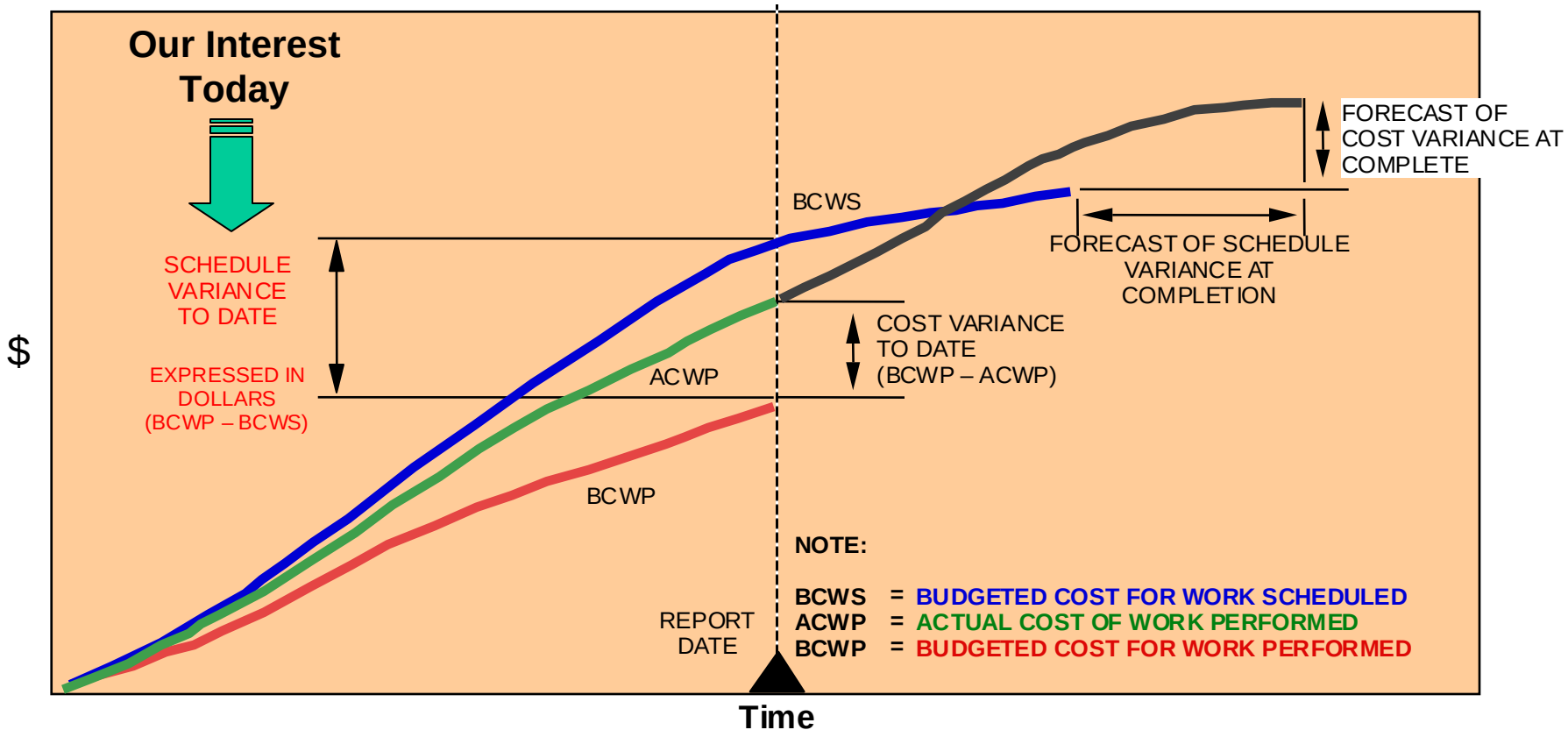
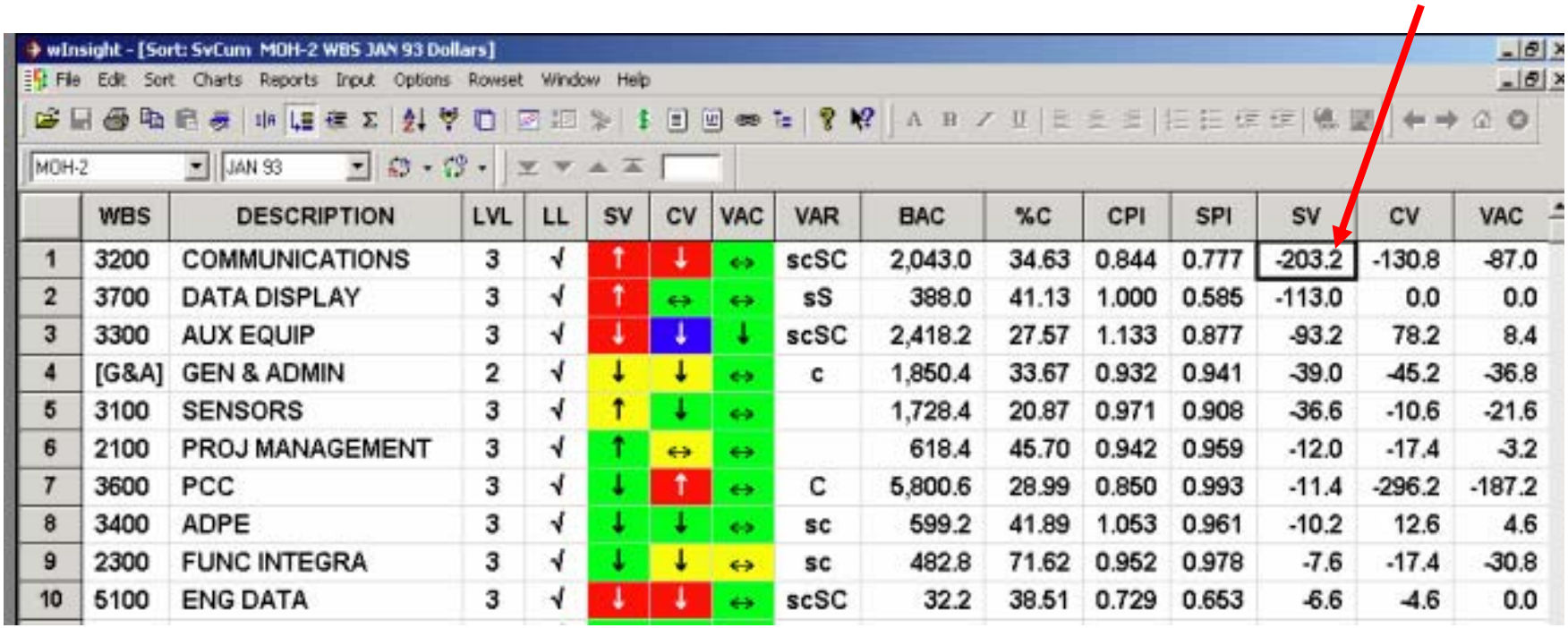
EVMS AND YOUR SCHEDULE:
Cost & Schedule Integration

EVMS VARIANCES



So, What Kind of a Schedule Variance Do We Have?



	WBS	DESCRIPTION	LVL	LL	SV	CV	VAC	VAR	BAC	%C	CPI	SPI	SV	CV	VAC
1	3200	COMMUNICATIONS	3	√	↑	↓	↔	scSC	2,043.0	34.63	0.844	0.777	-203.2	-130.8	-87.0
2	3700	DATA DISPLAY	3	√	↑	↔	↔	sS	388.0	41.13	1.000	0.585	-113.0	0.0	0.0
3	3300	AUX EQUIP	3	√	↓	↓	↓	scSC	2,418.2	27.57	1.133	0.877	-93.2	78.2	8.4
4	[G&A]	GEN & ADMIN	2	√	↓	↓	↔	c	1,850.4	33.67	0.932	0.941	-39.0	-45.2	-36.8
5	3100	SENSORS	3	√	↑	↓	↔		1,728.4	20.87	0.971	0.908	-36.6	-10.6	-21.6
6	2100	PROJ MANAGEMENT	3	√	↑	↔	↔		618.4	45.70	0.942	0.959	-12.0	-17.4	-3.2
7	3600	PCC	3	√	↓	↑	↔	C	5,800.6	28.99	0.850	0.993	-11.4	-296.2	-187.2
8	3400	ADPE	3	√	↓	↓	↔	sc	599.2	41.89	1.053	0.961	-10.2	12.6	4.6
9	2300	FUNC INTEGRA	3	√	↓	↓	↔	sc	482.8	71.62	0.952	0.978	-7.6	-17.4	-30.8
10	5100	ENG DATA	3	√	↓	↓	↔	scSC	32.2	38.51	0.729	0.653	-6.6	-4.6	0.0

Note: This example is courtesy of CS-Solutions. The above screen capture is from wInsight.

What Does $200,000 Behind Schedule Mean?!

- Well, it depends.
- It definitely means you haven't completed as much work as you had planned to by now.
- One approach to translating an earned value schedule variance into a time oriented one is

$$\text{Months Ahead or Behind} = \frac{\text{SV}}{\text{Avg. Monthly BCWS}^*}$$

*The average BCWS may be calculated using the total contract months to date or a selected number of recent months

Per Average BCWS, $200K = How Many Months

- Inception to Date Average Monthly BCWS

$$\frac{\$203.2\,K}{\$91.1K} = 2.23 \text{ Months Behind}$$

- Most Recent 3 Months

$$\frac{\$203.2\,K}{\$160.2K} = 1.27 \text{ Months Behind}$$

- Most Recent Month

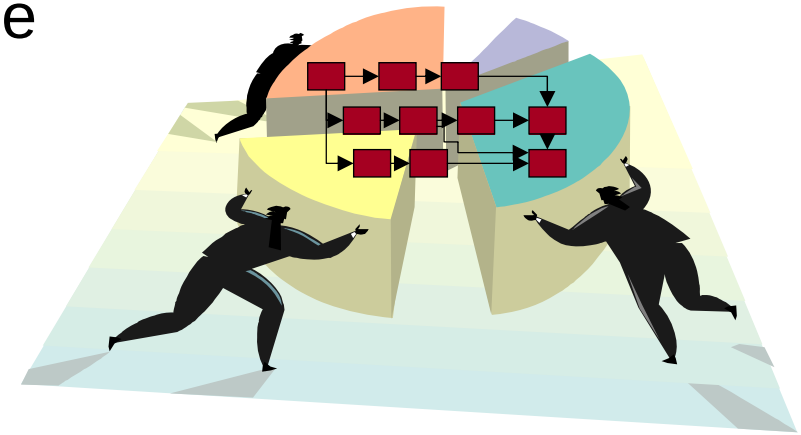
$$\frac{\$203.2K}{\$199.4K} = 1.02 \text{ Months Behind}$$

Another Alternative

- You could replace BCWS in the denominator with BCWP
  - The equation with BCWS translates to how far you are behind/ahead of schedule relative to the plan
  - Using BCWP gives you an indication of how far you are behind/ahead of schedule in the context of the pace at which you are accomplishing the work

However

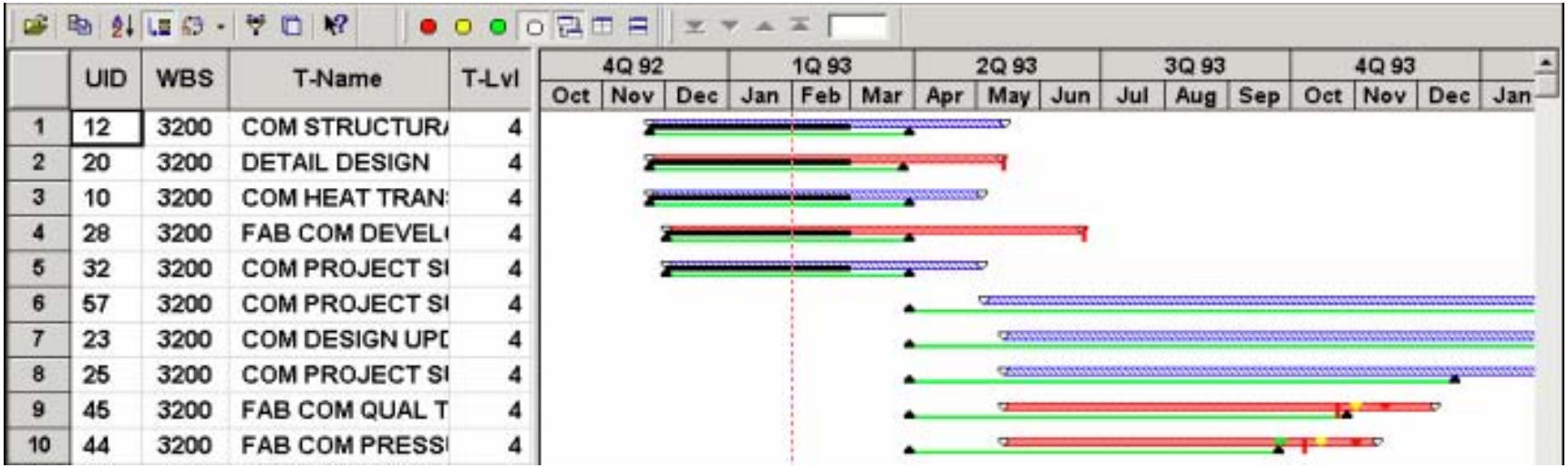
- Depending on which activities are behind schedule per the plan, you may or may not be behind schedule
  - The EVMS schedule variance is actually an accomplishment variance
  - But you won't know whether you actually have a schedule issue until you look at the physical schedule



Accomplishment Variances vs. Schedule Variances

- **Accomplishment Variance** - the difference between the quantified value of work accomplished and the quantified value of work scheduled, there is no time component
- **Schedule Variance** (SV) - **in EV terms**, a SV is the difference between BCWP and BCWS. The difference between these two indicates whether work is being accomplished or performed relative to how the effort was planned
- **Schedule Variance** (SV) - **in terms of the schedule**, this type of SV would also consider float information, since an effort could be accomplished later than planned but not effect the overall project completion date

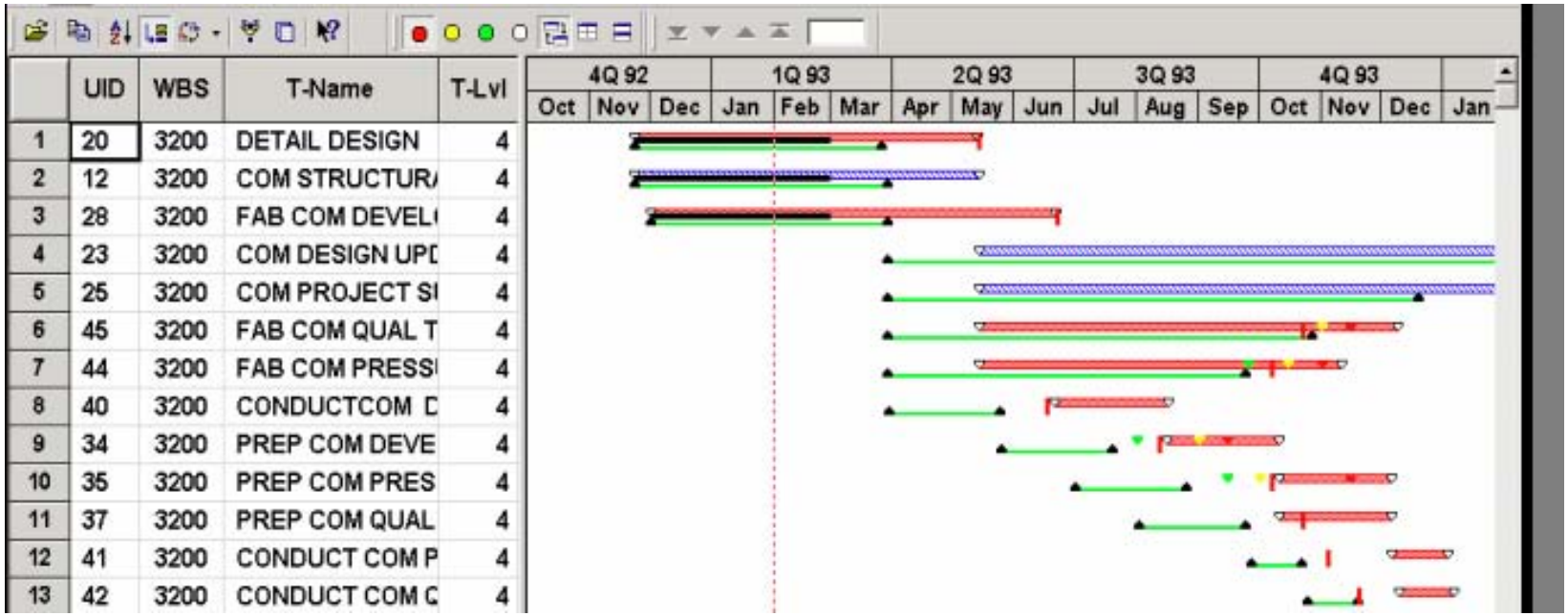
And, The Schedule Says



	UID	WBS	T-Name	T-Lvl
1	12	3200	COM STRUCTUR/	4
2	20	3200	DETAIL DESIGN	4
3	10	3200	COM HEAT TRAN:	4
4	28	3200	FAB COM DEVEL(	4
5	32	3200	COM PROJECT SI	4
6	57	3200	COM PROJECT SI	4
7	23	3200	COM DESIGN UPI	4
8	25	3200	COM PROJECT SI	4
9	45	3200	FAB COM QUAL T	4
10	44	3200	FAB COM PRESS(	4

- Here is a partial screen capture of all the activities associated with our WBS element that are late or are forecasted to be late.
- Tasks 12, 20, 10, 28 and 32 are late and are all contributing to the -$203.2K SV
- But only tasks 20 and 28 are on the critical path. Regardless of the $ value of our SV, these are significant, because they put the project end date is in jeopardy.

Are There Other Concerns?



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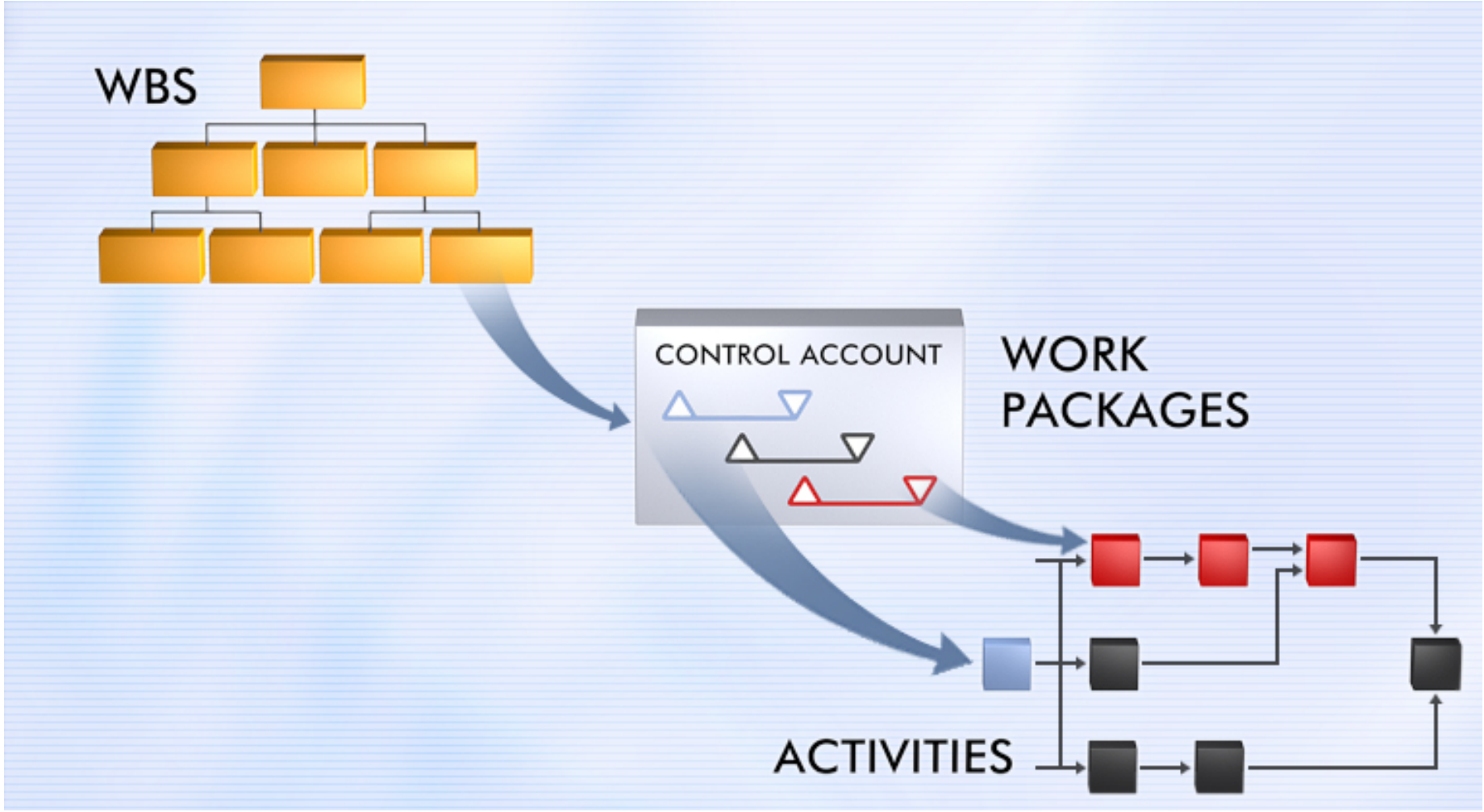
5	25	3200	COM PROJECT SI	4
6	45	3200	FAB COM QUAL T	4
7	44	3200	FAB COM PRESSI	4
8	40	3200	CONDUCTCOM D	4
9	34	3200	PREP COM DEVE	4
10	35	3200	PREP COM PRES	4
11	37	3200	PREP COM QUAL	4
12	41	3200	CONDUCT COM P	4
13	42	3200	CONDUCT COM C	4

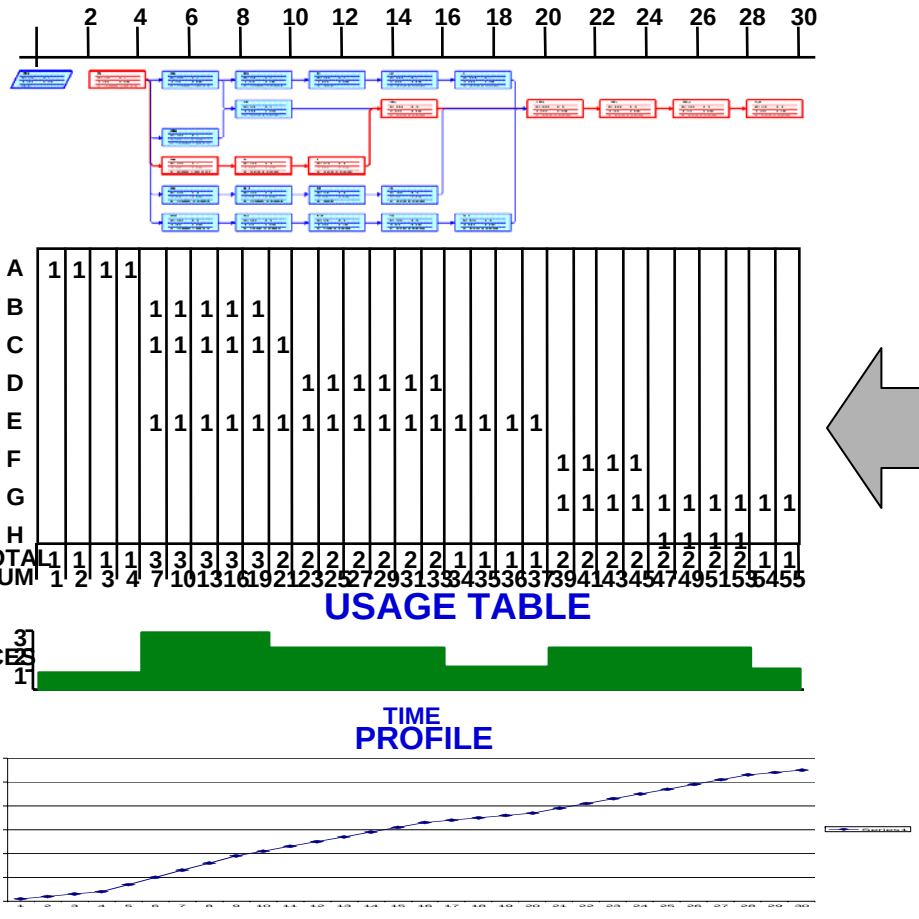
- Here the red filter is engaged, meaning one or more of the following conditions exist:
  - The task is forecasted to complete more than 30 days late.
  - There have been 3 slips of the execution schedule in the last 4 months.
  - The item has negative float
- Thus, while Task 12 isn't on the critical path, it is still a worry
- AND, how about those unstarted tasks

Of Course, There Are Some Things We Need to Confirm Before We Play the Schedule Against The EVM Data

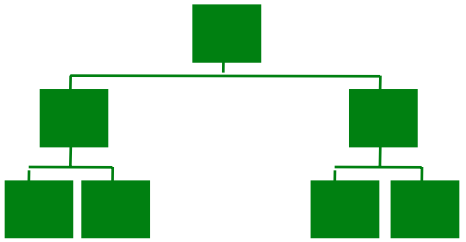
Your Cost & Schedule Planning is Integrated and Consistent, Right?



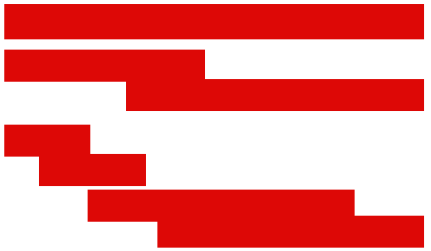
You Also Synched Resources and Budgets, Right?



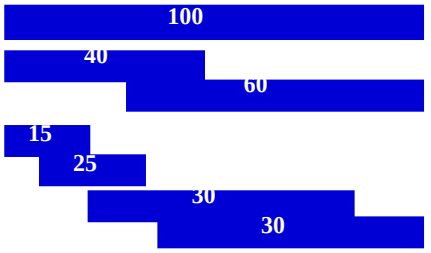
1. Define The Work



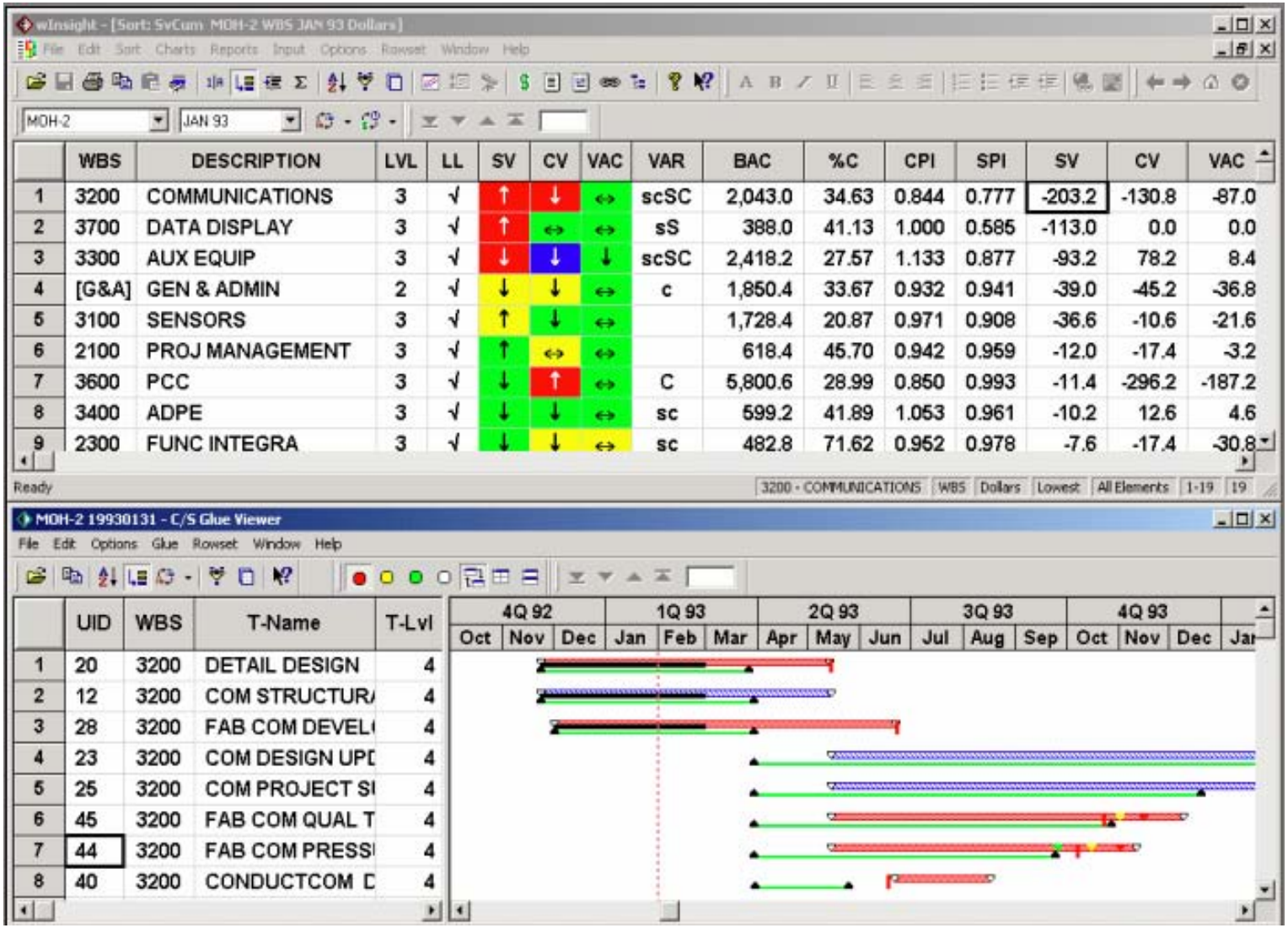
2. Schedule The Work



3. Allocate Budgets



If So, You Can Meaningfully Compare EVMS Data to Your Schedule



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7	44	3200	FAB COM PRESSI	4
8	40	3200	CONDUCTCOM D	4

Courtesy of CS Solutions

FOOD FOR THOUGHT: Schedule Variance Categories

- "Problem"
  - Critical tasks that did not start on time
- "Late with Float"
  - Tasks that did not start on time but are not critical
- "Purposely Delayed"
  - Tasks delayed due to work-around
- "Early"
  - Tasks begun ahead of planned start
- "Anomalies/Errors"

Schedule Variance Example

- Schedule variance 3500 - 4000 = (500)

Problem	- 100
Late with float	- 300
Purposely delayed	- 200
Early	+ 100
	- 500

The Schedule Performance Index (SPI)

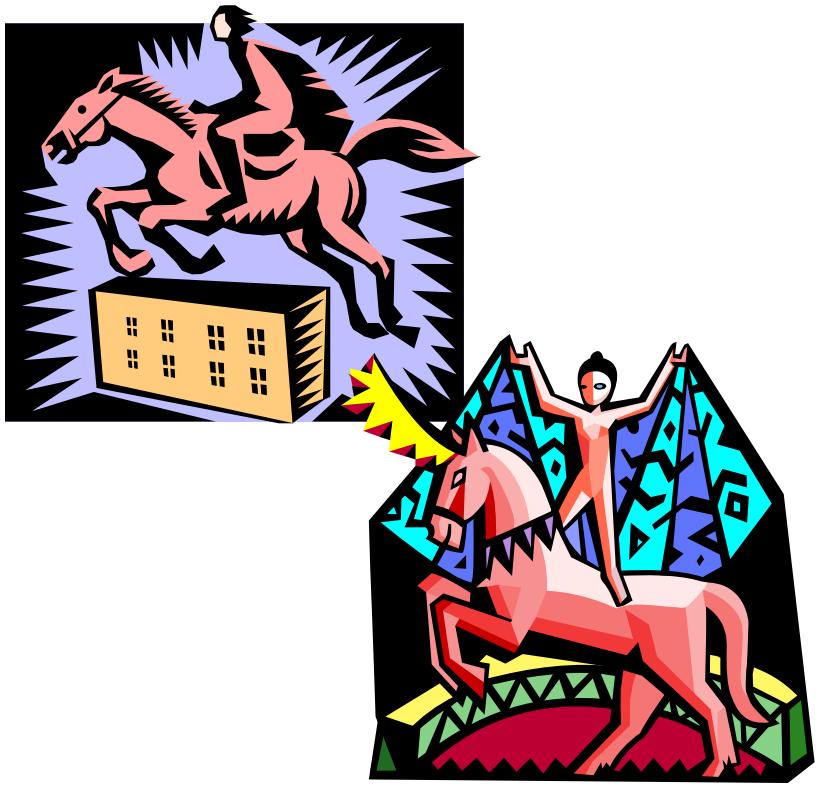
- Let's pause and talk about another EVMS concept
- The SPI is a measure of how efficient we have been in accomplishing our work relative to our plan for its accomplishment
- It is calculated per the formula

$$\mathbf{SPI} = \frac{\mathbf{BCWP}}{\mathbf{BCWS}}$$

Does the SPI Always Tell the Story?

SPI \ Float	Negative	Positive
SPI<1.0	Almost always a bad situation	May be a good situation
SPI>1.0	Are we working on non-CP tasks ahead of schedule?	Looks good

This Is Not a One Trick Pony



- We're not just checking to see if the EVMS schedule variance makes sense.
- You should be able to use your EVMS data to help you make decisions about your schedule.
- What is a realistic remaining duration?
- How many resources are needed for remaining tasks?

When Will We Get There, Mom?

- If your schedule performance efficiency doesn't improve, how long will this project take?
- You can reexamine the possible duration of tasks yet to start.

$$\frac{\text{Planned Duration}}{\text{SPI}}$$

- You can confirm your thinking about remaining duration for on-going tasks.
- How does the remaining duration for this task compare with:

$$\left(\frac{\text{Planned Duration}}{\text{SPI}} - \text{Time Already Elapsed}\right)$$

COST PERFORMANCE INDEX (CPI)

- If you are an EVMSer, you probably love cost information; so we can't quit without at least mentioning it
- The CPI is a measure of your cost efficiency
- It is calculated per this formula

$$\mathbf{CPI} = \frac{\mathbf{BCWP}}{\mathbf{ACWP}}$$

Do You Have Enough People?

- When you assess your CPI in terms of hours, how do the authorized resources for remaining work compare with

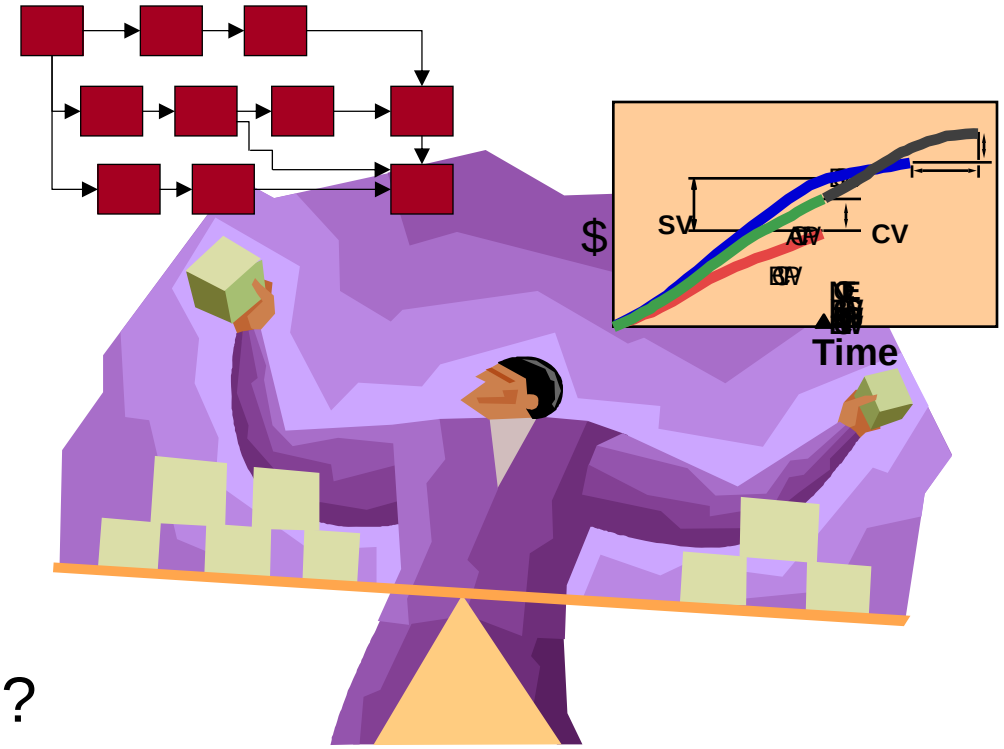
$$\frac{\textbf{Planned Resources *}}{\textbf{CPI}}$$

- Is your estimate to complete (ETC) in your EVMS consistent with this?

***Budgeted Resources for remaining work**

So?

- We all talk about the integration of cost and schedule.
- If we have achieved this, the EV and the scheduling information should correlate.
- How well is your organization doing this?



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